Trans-Cal Industries, Inc.

EET-200E
ENCODER EMULATOR

USER MANUAL



Trans-Cal Industries, Inc.
16141 Cohasset Street
Van Nuys, CA   91406-2908
(818)787-1221 * (800)423-2913 * (818)787-8916FAX
www.trans-cal.com

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Trans-Cal Industries, Inc.
16141 Cohasset Street
Van Nuys, CA 91406

818/787-1221
800/423-2913
FAX 818/787-8916
www.trans-cal.com

History of Revision

Revision	Date	Description
A	02/2008	EET-200E Model update.

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Introduction

This manual is intended to provide the information required to use the Trans-Cal EET-200E to localize problems between an altitude encoding unit, the interconnecting wiring harness, or transponder. With the EET-200E you will quickly isolate malfunctioning equipment.

This manual is intended for use only by persons who are qualified to install and service the equipment described herein, pursuant to current federal, state, and local government regulatory requirements.

A typical altitude reporting system in an aircraft consists of four primary sections.

1. **Power supply.** Typically this is a 12 or 28 volt dc regulated system supplying power to the avionics on the aircraft.

2. **Altitude encoding unit**. This unit, such as the Trans-Cal SSD120 altitude encoder, samples the outside barometric pressure, converts this input to a serial or parallel data stream and sends this information to a transponder for processing.

3. **Transponder.** This unit receives the data stream of altitude information from the altitude encoder, processes the information and relays it along with other data to the FAA air traffic control system.

4. **Wiring harness system.** This consists of all interconnection wiring between the various components required to move altitude data and power.

General Description:

The Trans-Cal EET-200E Encoder Emulator allows 5 basic test modes. Altitude encoder output test, cable test, transponder test, enable (strobe) test and power polarity test.

Altitude Encoder Test:

When used to test an altitude encoder, the EET-200E can display the output of the encoder by showing the status of each of the 11 data bits comprising the parallel output channel. Labeled D2 through C4, this information is displayed via 11 red light emitting diodes. If the data bit is low (ON) then the LED is on, and conversely if the data bit is high (OFF) then the corresponding LED is off.

Setting the primary flight altimeter to 29.92 In. Hg. will display the current pressure altitude. By comparing the EET's line of 11 data bit LED's with the Gray Code Chart, the current altitude from the encoder can be verified. If the parallel output data does not match the pressure altitude displayed on the primary flight altimeter, then not only can the fault be localized to the encoder, but the offending data bit or bits can be identified.

Cable Test:

Altitude encoder problems are often traced to the interconnecting wiring harness. By connecting the EET-200E to the encoder using the factory supplied wiring harness the technician can quickly isolate the problem by comparing the encoder output displayed on the EET-200E to the output of the transponder. The comparison will then enable the technician to determine which data bit is open or shorted. Alternatively, by connecting the EET-200E to the transponder and selecting to force all the data bits either high or low the technician may evaluate the transponder wiring harness for opens or shorts.

Transponder Test:

When used to test the transponder, the EET-200E can simulate 4 different altitudes and output them individually via its parallel output port. These test altitudes are selected via the 6 position rotary switch located below the LED display, and will utilize all 11 data bits of the grey code. In addition to the 4 predefined altitude outputs you may also force all 11 gray code data bits either high or low.

The 4 switch settings represent the following altitudes and data outputs:

1. +1000 Feet.

D2	D4	A1	A2	A4	B1	B2	B4	C1	C2	C4

2. +4100 Feet.

D2	D4	A1	A2	A4	B1	B2	B4	C1	C2	C4

3. +15700 Feet.

D2	D4	A1	A2	A4	B1	B2	B4	C1	C2	C4

4. +31000 Feet.

D2	D4	A1	A2	A4	B1	B2	B4	C1	C2	C4

5. All 11 Gray Code data bits “ON”.

D2	D4	A1	A2	A4	B1	B2	B4	C1	C2	C4

6. All 11 Gray Code data bits “OFF”.

D2	D4	A1	A2	A4	B1	B2	B4	C1	C2	C4

Encoder Enable (Strobe) Test:

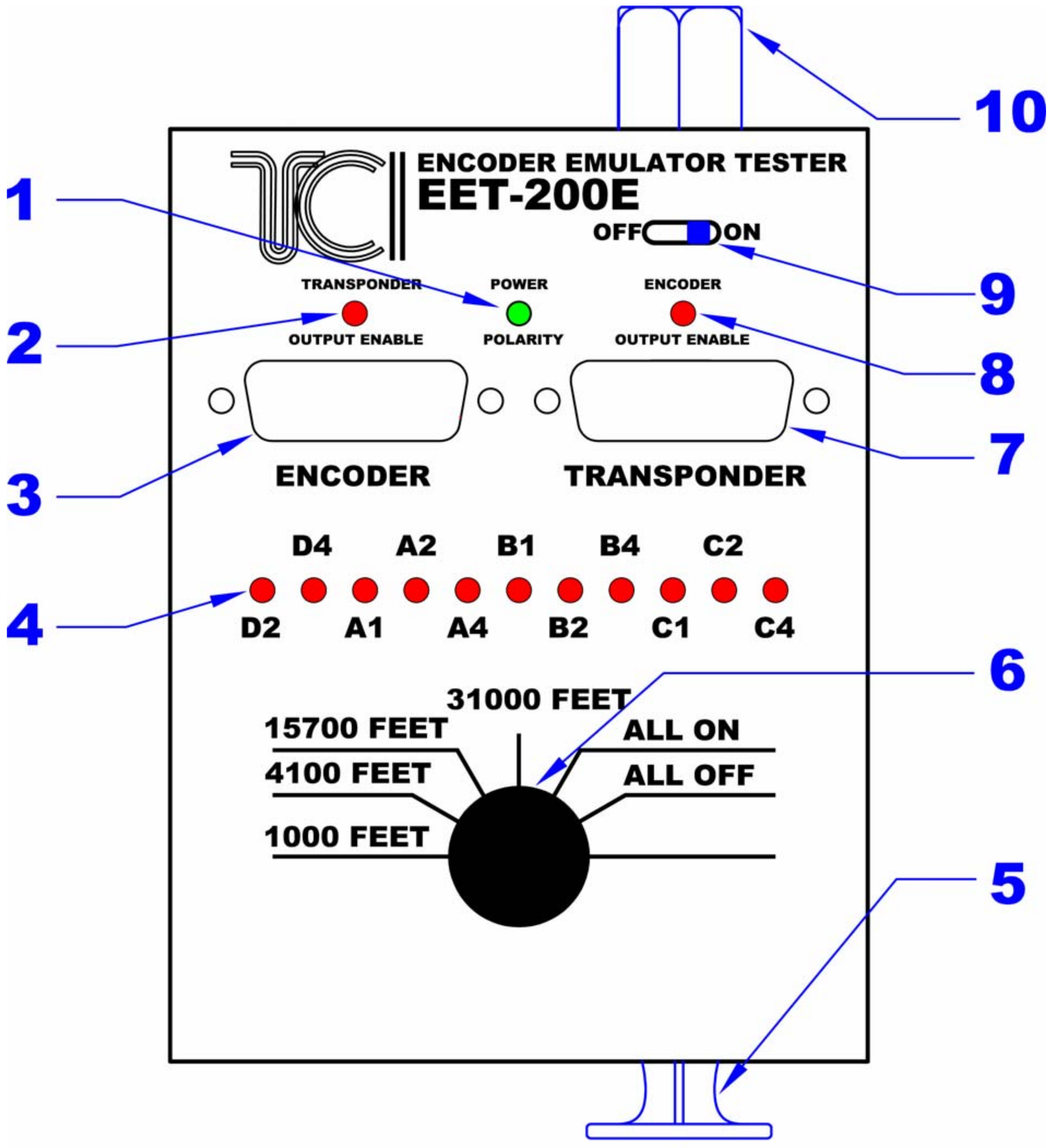
The LED at the upper left of the unit indicates whether or not the transponder is selecting this unit (altitude encoder) for operation. Sometimes called a “strobe” or “altitude common” or “encoder enable.” In some applications, one transponder will be connected to two altitude encoders on the same parallel data bus. This is usually done in order to have one unit as a backup. However, in such an installation only one altitude encoder may be selected (active) at a time. This is accomplished by the transponder or pilot grounding pin 6 (strobe) of only one altitude encoder at a time.

By plugging in the EET-200E in place of the altitude encoder you can observe the “Transponder Output Enable” LED and quickly ascertain if this has been selected by the transponder.

Power Polarity Test:

The LED in the center of the EET-200E labeled “Power Polarity” will glow green for a properly connected power input, and glow red when power and ground are reversed.

Front Panel Description:



1 Power Polarity Indicator
2 Transponder Output Enable Indicator
3 Encoder Connector
4 Gray Code Data LED Display
5 Vacuum Syringe Pump
6 Altitude Output Selector Switch
7 Transponder Connector
8 Encoder Enable Indicator
9 Encoder Enable Slide Switch
10 Vacuum Input Connector

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Power Polarity Indicator:

This is a dual color LED that indicates the following conditions.

A. When the LED is GREEN the power pins on the Transponder cable are wired correctly. Pin 15 = ground, pin 8 & 14 = +Voltage.
B. When the LED is RED the power pins on the Transponder cable are wired incorrectly.

2

Transponder Output Enable Indicator:

This red LED shows the status of the encoder enable line (pin 6) on the transponder connector.

A. **On full brightness**. This indicates that Pin 6 of the transponder connector is grounded. The transponder controls this line.

B. **Off.** This indicates that pin 6 of the transponder connector is open (floating). The transponder controls this line.

3

Encoder Connector:

This connector is used to communicate from the EET-200E Encoder Emulator to the Altitude Encoder .

4

Gray Code Data LED Display:

These 11 red LED lights display the current gray code output from the altitude encoder. Refer to the chapter on Gray Code for a complete description and lookup table.

5

Vacuum Syringe Pump:

By pulling back on this plunger you can create sufficient vacuum to drive an encoder to over 30,000’. Note: For best results, use the supplied 12” by 1/8” tubing to connect the EET-200E to the encoder under test.

6
Altitude Output Selector Switch:

This rotary switch is used to select what output code will be sent to the transponder. By selecting all the positions (one at a time) and observing the corresponding output from the transponder, you can verify that all 11 gray code data bits are working correctly.

7
Transponder Connector:

This connector is used to communicate from the EET-200E Encoder Emulator to the aircraft transponder.

8
Encoder Enable Indicator:

This Red LED shows the status of the encoder enable line (pin 6) on the encoder connector.

The following is a list of conditions that this indicator will display:

When the EET-200E unit is used on a 28 volt aircraft system:

A. **On full intensity**. This indicates that the EET-200E Encoder Enable Switch is in the “ON” position and that Pin 6 of the encoder connector is grounded.

B. **On Half intensity**. This indicates that the EET-200E Encoder Enable Switch is in the “OFF” position and that Pin 6 of the encoder connector is open (floating).

C. **Off.** This indicates that ether the encoder connector cable is not plugged into the encoder, or no power is being supplied by the aircraft, or the wire going to pin 6 of the encoder connector is open.

When the EET-200E unit is used on a 12 volt aircraft system:

A. **On full intensity**. This indicates that the EET-200E Encoder Enable Switch is in the “ON” position and that Pin 6 of the encoder connector is grounded.

B. **Off.** This indicates that the EET-200E Encoder Enable Switch is in the “OFF” position and that Pin 6 of the encoder connector is open (floating).

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Encoder Enable Slide Switch:

A. When in the “ON” position , pin number 6 on the encoder connector is grounded.

B. When in the “OFF” position, pin number 6 of the encoder connector is open (floating).

Pin 6 of the altitude encoder is used to enable or disable the output of the encoder. This pin is usually always grounded and only comes into use when two encoders share the same data bus (one unit acting as the backup) and the operator determines which unit is active. Or, an older model transponder may use this line to selectively enable the altitude data.

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Vacuum Output Fitting:

Connect the supplied 12” 1/8” tubing to this fitting and then to the vacuum input port on the encoder under test.

Operating the EET-200E:

Testing the Transponder:

In this test we will ascertain whether the transponder is transmitting the correct altitude information. In order to do this you will need to have some means of monitoring the information that is being transmitted from the transponder to the FAA air traffic control system. (IFR ATC 600 ramp test set or equal.) After connecting the EET-200E Encoder Emulator to the transponder, you will be able to select specific known altitude data to send to the transponder. By monitoring the transponder's output you should be able to determine if the unit is functioning properly.

Step 1 Hooking up the Equipment.

2. Remove power from the avionics buss and unplug the cable from to the existing altitude encoder.

3. Take the cable that was plugged into the altitude encoder and plug it into the connector marked "TRANSPONDER" on the EET-200E.

4. Apply power to the avionics buss and verify that the upper left red LED marked "TRANSPONDER OUTPUT ENABLE" on the EET-200E is on.

Step 2 Testing the Transponder.

1. Rotate the altitude select switch on the EET-200E to the "+1000 FEET" position.

2. Verify that the transponder is reporting +1000 feet of altitude.

3. Continue to test each altitude setting. Verify at each setting that the altitude being reported by the transponder is the same as the EET-200E setting. By testing all 4 altitude switch settings you will verify that all 11 data lines comprising the gray code are functioning correctly and that both the transponder and the cabling between the transponder and the altitude encoder are functioning correctly.

Step 3 Troubleshooting.

1. If the altitude being reported by the transponder does not match the EET-200E setting then a problem exists and further testing is required.

    A. You must first determine if the problem resides in the transponder or in the cabling between the transponder and the altitude encoder.

    B. Either the cable or the transponder must be swapped with known good units in order to isolate the defective device.

2. Repeat the procedure in “Step 2 Testing the Transponder”.

3. When the offending component has been isolated (removed and system working properly), it is recommended that the defective unit be put back into the system to verify that the problem is again present.

Testing the Altitude Encoder.

This test will determine if the altitude encoder is sending data and if so, whether it is sending the correct altitude data.

Step 1 Hooking up the Equipment.

1. With the avionics power off, unplug the existing altitude encoder.
2. Take the cable that was plugged into the altitude encoder and plug it into the connector marked “TRANSPONDER” on the EET-200E
3. Take the 15 pin cable supplied with the EET-200E (part number 950006) and connect it from the altitude encoder to the connector marked “ENCODER” on the EET-200E unit.

Step 2 Testing the Altitude Encoder.

1. Apply power to the avionics.
2. Make sure that the “ENCODER OUTPUT ENABLE” switch is in the “ON” position and that the “ENCODER OUTPUT ENABLE” LED is on. This confirms that the unit is selected and, if functioning, should be transmitting data.
3. The EET-200E should now display the Gray Code output from the altitude encoder on the 11 red LED’s.
4. The Gray Code data displayed should indicate the current field pressure altitude. Set the primary flight altimeter to 29.92 In. Hg., and its reading should match the altitude encoder within ±125 feet.
5. Use the Gray Code lookup table (pgs 16-31) to verify that the output data is correct.
6. In order to test the unit over its full operational range you will need to connect a pitot-static test set to the altitude encoder.
7. With the pitot-static test set running (normal pumping down of pressure), observe that all the data LED’s on the EET-200E cycle on and off at least one time. While this will not tell you if the altitude encoder under test is reporting the altitude accurately, it does show that all the data bits are functional. If all the data bits are cycling on and off and the altitude data is still incorrect then the altitude encoder may need to be re-calibrated.

Alternatively, the EET-200E includes an internal syringe and external pressure fitting to provide the technician a quick method of generating a small vacuum to test the altitude encoder. After connecting the altitude encoder's static line to the EET-200E pressure port, pull or push the syringe handle to create vacuum or pressure. Note: the amount of altitude change is directly proportional to the volume that the syringe is acting on. A large volume will yield a small altitude change and a small volume will yield a great change. If possible, use the supplied 12" length of 1/8" tubing to connect the EET-200E to the encoder. Keep tubing connections short and use a small diameter hose to maximize the amount of altitude change realized using the EET-200E's internal syringe.

Step 3 Trouble Shooting.

1. If you observe a problem with the gray code output then you can assume that the cabling from the altitude encoder to the transponder is good and that the problem resides in the altitude encoder. You should then be able to verify this by swapping out the altitude encoder with a known good unit.

2. Conversely, if you are trying to localize a problem and the altitude encoder performs correctly using the EET-200E, then the problem could reside in the cabling between the altitude encoder and the transponder.

3. Some of the problems that you may observe using the EET-200E are:

    A. One or more data bit LED stays on all the time.

    B. One or more data bit LED stays off all the time.

    C. Two adjacent data bit LED's follow each other. They both are on and off together.

4. When any of these errors are observed then most likely the altitude encoder is malfunctioning and needs to be replaced.

Altitude Transmission Code:

Gray Code - Special binary code used to transmit altitude data between framing pulses of a transponder reply. A cyclic code having only one digit change at a time. Used in Mode C to transmit aircraft barometric altitude. Also known as Gilham code.

Altitude	Gray Code	D2	D4	A1	A2	A4	B1	B2	B4	C1	C2	C4
-1100	C2, C4											
-1000	C2											
-900	C1, C2											
-800	C1											
-700	B4, C1											
-600	B4, C1, C2											
-500	B4, C2											
-400	B4, C2, C4											
-300	B4, C4											
-200	B2, B4, C4											
-100	B2, B4, C2, C4											
000	B2, B4, C2											
800	B1,B2, C4											
2800	A4, B1, C4											
6800	A2, A4, C4											
14800	A1, A2, C4											
30800	D4, A1, C4											
62800	D2, D4, C4 (optional)											

Gray Code From -1000’ to 2950’

Altitude Range	D2	D4	A1	A2	A4	B1	B2	B4	C1	C2	C4
-1000 to -950	0	0	0	0	0	0	0	0	0	1	0
-950 to -850	0	0	0	0	0	0	0	0	1	1	0
-850 to -750	0	0	0	0	0	0	0	0	1	0	0
-750 to -650	0	0	0	0	0	0	0	1	1	0	0
-650 to -550	0	0	0	0	0	0	0	1	1	1	0
-550 to -450	0	0	0	0	0	0	0	1	0	1	0
-450 to -350	0	0	0	0	0	0	0	1	0	1	1
-350 to -250	0	0	0	0	0	0	0	1	0	0	1
-250 to -150	0	0	0	0	0	0	1	1	0	0	1
-150 to -50	0	0	0	0	0	0	1	1	0	1	1
-50 to 50	0	0	0	0	0	0	1	1	0	1	0
50 to 150	0	0	0	0	0	0	1	1	1	1	0
150 to 250	0	0	0	0	0	0	1	1	1	0	0
250 to 350	0	0	0	0	0	0	1	0	1	0	0
350 to 450	0	0	0	0	0	0	1	0	1	1	0
450 to 550	0	0	0	0	0	0	1	0	0	1	0
550 to 650	0	0	0	0	0	0	1	0	0	1	1
650 to 750	0	0	0	0	0	0	1	0	0	0	1
750 to 850	0	0	0	0	0	1	1	0	0	0	1
850 to 950	0	0	0	0	0	1	1	0	0	1	1
950 to 1050	0	0	0	0	0	1	1	0	0	1	0
1050 to 1150	0	0	0	0	0	1	1	0	1	1	0
1150 to 1250	0	0	0	0	0	1	1	0	1	0	0
1250 to 1350	0	0	0	0	0	1	1	1	1	0	0
1350 to 1450	0	0	0	0	0	1	1	1	1	1	0
1450 to 1550	0	0	0	0	0	1	1	1	0	1	0
1550 to 1650	0	0	0	0	0	1	1	1	0	1	1
1650 to 1750	0	0	0	0	0	1	1	1	0	0	1
1750 to 1850	0	0	0	0	0	1	0	1	0	0	1
1850 to 1950	0	0	0	0	0	1	0	1	0	1	1
1950 to 2050	0	0	0	0	0	1	0	1	0	1	0
2050 to 2150	0	0	0	0	0	1	0	1	1	1	0
2150 to 2250	0	0	0	0	0	1	0	1	1	0	0
2250 to 2350	0	0	0	0	0	1	0	0	1	0	0
2350 to 2450	0	0	0	0	0	1	0	0	1	1	0
2450 to 2550	0	0	0	0	0	1	0	0	0	1	0
2550 to 2650	0	0	0	0	0	1	0	0	0	1	1
2650 to 2750	0	0	0	0	0	1	0	0	0	0	1
2750 to 2850	0	0	0	0	1	1	0	0	0	0	1
2850 to 2950	0	0	0	0	1	1	0	0	0	1	1
2950 to 3050	0	0	0	0	1	1	0	0	0	1	0

Gray Code From 3050' to 7250'

Altitude Range	D2	D4	A1	A2	A4	B1	B2	B4	C1	C2	C4
3050 to 3150	0	0	0	0	1	1	0	0	1	1	0
3150 to 3250	0	0	0	0	1	1	0	0	1	0	0
3250 to 3350	0	0	0	0	1	1	0	1	1	0	0
3350 to 3450	0	0	0	0	1	1	0	1	1	1	0
3450 to 3550	0	0	0	0	1	1	0	1	0	1	0
3550 to 3650	0	0	0	0	1	1	0	1	0	1	1
3650 to 3750	0	0	0	0	1	1	0	1	0	0	1
3750 to 3850	0	0	0	0	1	1	1	1	0	0	1
3850 to 3950	0	0	0	0	1	1	1	1	0	1	1
3950 to 4050	0	0	0	0	1	1	1	1	0	1	0
4050 to 4150	0	0	0	0	1	1	1	1	1	1	0
4150 to 4250	0	0	0	0	1	1	1	1	1	0	0
4250 to 4350	0	0	0	0	1	1	1	0	1	0	0
4450 to 4550	0	0	0	0	1	1	1	0	1	1	0
4550 to 4650	0	0	0	0	1	1	1	0	0	1	0
4650 to 4750	0	0	0	0	1	1	1	0	0	1	1
4750 to 4850	0	0	0	0	1	0	1	0	0	0	1
4850 to 4950	0	0	0	0	1	0	1	0	0	0	1
4950 to 5050	0	0	0	0	1	0	1	0	0	1	1
5050 to 5150	0	0	0	0	1	0	1	0	0	1	0
5150 to 5250	0	0	0	0	1	0	1	0	1	1	0
5250 to 5350	0	0	0	0	1	0	1	0	1	0	0
5350 to 5450	0	0	0	0	1	0	1	1	1	0	0
5450 to 5550	0	0	0	0	1	0	1	1	1	1	0
5550 to 5650	0	0	0	0	1	0	1	1	0	1	0
5650 to 5750	0	0	0	0	1	0	1	1	0	1	1
5750 to 5850	0	0	0	0	1	0	1	1	0	0	1
5850 to 5950	0	0	0	0	1	0	0	1	0	0	1
5950 to 6050	0	0	0	0	1	0	0	1	0	1	1
6050 to 6150	0	0	0	0	1	0	0	1	0	1	0
6150 to 6250	0	0	0	0	1	0	0	1	1	1	0
6250 to 6350	0	0	0	0	1	0	0	1	1	0	0
6350 to 6450	0	0	0	0	1	0	0	0	1	0	0
6450 to 6550	0	0	0	0	1	0	0	0	1	1	0
6550 to 6650	0	0	0	0	1	0	0	0	0	1	0
6650 to 6750	0	0	0	0	1	0	0	0	0	1	1
6750 to 6850	0	0	0	1	1	0	0	0	0	0	1
6850 to 6950	0	0	0	1	1	0	0	0	0	0	1
6950 to 7050	0	0	0	1	1	0	0	0	0	1	1
7050 to 7150	0	0	0	1	1	0	0	0	0	1	0
7150 to 7250	0	0	0	1	1	0	0	0	1	1	0
7250 to 7350	0	0	0	1	1	0	0	0	1	0	0

Gray Code From 7350' to 11450'

Altitude Range	D2	D4	A1	A2	A4	B1	B2	B4	C1	C2	C4
7350 to 7450	0	0	0	1	1	0	0	1	1	1	0
7450 to 7550	0	0	0	1	1	0	0	1	0	1	0
7550 to 7650	0	0	0	1	1	0	0	1	0	1	1
7650 to 7750	0	0	0	1	1	0	0	1	0	0	1
7750 to 7850	0	0	0	1	1	0	1	1	0	0	1
7850 to 7950	0	0	0	1	1	0	1	1	0	1	1
7950 to 8050	0	0	0	1	1	0	1	1	0	1	0
8050 to 8150	0	0	0	1	1	0	1	1	1	1	0
8150 to 8250	0	0	0	1	1	0	1	1	1	0	0
8250 to 8350	0	0	0	1	1	0	1	0	1	0	0
8350 to 8450	0	0	0	1	1	0	1	0	1	1	0
8450 to 8550	0	0	0	1	1	0	1	0	0	1	0
8550 to 8650	0	0	0	1	1	0	1	0	0	1	1
8650 to 8750	0	0	0	1	1	0	1	0	0	0	1
8750 to 8850	0	0	0	1	1	1	1	0	0	0	1
8850 to 8950	0	0	0	1	1	1	1	0	0	1	1
8950 to 9050	0	0	0	1	1	1	1	0	0	1	0
9050 to 9150	0	0	0	1	1	1	1	0	1	1	0
9150 to 9250	0	0	0	1	1	1	1	0	1	0	0
9250 to 9350	0	0	0	1	1	1	1	1	1	0	0
9350 to 9450	0	0	0	1	1	1	1	1	1	1	0
9450 to 9550	0	0	0	1	1	1	1	1	0	1	0
9550 to 9650	0	0	0	1	1	1	1	1	0	1	1
9650 to 9750	0	0	0	1	1	1	1	1	0	0	1
9750 to 9850	0	0	0	1	1	1	0	1	0	0	1
9850 to 9950	0	0	0	1	1	1	0	1	0	1	1
9950 to 10050	0	0	0	1	1	1	0	1	0	1	0
10050 to 10150	0	0	0	1	1	1	0	1	1	1	0
10150 to 10250	0	0	0	1	1	1	0	1	1	0	0
10250 to 10350	0	0	0	1	1	1	0	0	1	0	0
10350 to 10450	0	0	0	1	1	1	0	0	1	1	0
10450 to 10550	0	0	0	1	1	1	0	0	0	1	0
10550 to 10650	0	0	0	1	1	1	0	0	0	1	1
10650 to 10750	0	0	0	1	1	1	0	0	0	0	1
10750 to 10850	0	0	0	1	0	1	0	0	0	0	1
10850 to 10950	0	0	0	1	0	1	0	0	0	1	1
10950 to 11050	0	0	0	1	0	1	0	0	0	1	0
11050 to 11150	0	0	0	1	0	1	0	0	1	1	0
11150 to 11250	0	0	0	1	0	1	0	0	1	0	0
11250 to 11350	0	0	0	1	0	1	0	1	1	0	0
11350 to 11450	0	0	0	1	0	1	0	1	1	1	0
11450 to 11550	0	0	0	1	0	1	0	1	0	1	0

Gray Code From 11550' to 15650'

Altitude Range	D2	D4	A1	A2	A4	B1	B2	B4	C1	C2	C4
11550 to 11650	0	0	0	1	0	1	0	1	0	1	1
11650 to 11750	0	0	0	1	0	1	0	1	0	0	1
11750 to 11850	0	0	0	1	0	1	1	1	0	0	1
11850 to 11950	0	0	0	1	0	1	1	1	0	1	1
11950 to 12050	0	0	0	1	0	1	1	1	0	1	0
12050 to 12150	0	0	0	1	0	1	1	1	1	1	0
12150 to 12250	0	0	0	1	0	1	1	1	1	0	0
12250 to 12350	0	0	0	1	0	1	1	0	1	0	0
12350 to 12450	0	0	0	1	0	1	1	0	1	1	0
12450 to 12550	0	0	0	1	0	1	1	0	0	1	0
12550 to 12650	0	0	0	1	0	1	1	0	0	1	1
12650 to 12750	0	0	0	1	0	1	1	0	0	0	1
12750 to 12850	0	0	0	1	0	0	1	0	0	0	1
12850 to 12950	0	0	0	1	0	0	1	0	0	1	1
12950 to 13050	0	0	0	1	0	0	1	0	0	1	0
13050 to 13150	0	0	0	1	0	0	1	0	1	1	0
13150 to 13250	0	0	0	1	0	0	1	0	1	0	0
13250 to 13350	0	0	0	1	0	0	1	1	1	0	0
13350 to 13450	0	0	0	1	0	0	1	1	1	1	0
13450 to 13550	0	0	0	1	0	0	1	1	0	1	0
13550 to 13650	0	0	0	1	0	0	1	1	0	1	1
13650 to 13750	0	0	0	1	0	0	1	1	0	0	1
13750 to 13850	0	0	0	1	0	0	0	1	0	0	1
13850 to 13950	0	0	0	1	0	0	0	1	0	1	1
13950 to 14050	0	0	0	1	0	0	0	1	0	1	0
14050 to 14150	0	0	0	1	0	0	0	1	1	1	0
14150 to 14250	0	0	0	1	0	0	0	1	1	0	0
14250 to 14350	0	0	0	1	0	0	0	0	1	0	0
14350 to 14450	0	0	0	1	0	0	0	0	1	1	0
14450 to 14550	0	0	0	1	0	0	0	0	0	1	0
14550 to 14650	0	0	0	1	0	0	0	0	0	1	1
14650 to 14750	0	0	0	1	0	0	0	0	0	0	1
14750 to 14850	0	0	1	1	0	0	0	0	0	0	1
14850 to 14950	0	0	1	1	0	0	0	0	0	1	1
14950 to 15050	0	0	1	1	0	0	0	0	0	1	0
15050 to 15150	0	0	1	1	0	0	0	0	1	1	0
15150 to 15250	0	0	1	1	0	0	0	0	1	0	0
15250 to 15350	0	0	1	1	0	0	0	1	1	0	0
15350 to 15450	0	0	1	1	0	0	0	1	1	1	0
15450 to 15550	0	0	1	1	0	0	0	1	0	1	1
15550 to 15650	0	0	1	1	0	0	0	1	0	0	1
15650 to 15750	0	0	1	1	0	0	0	1	0	0	1

Gray Code From 15750’ to 19850’

Altitude Range	D2	D4	A1	A2	A4	B1	B2	B4	C1	C2	C4
15750 to 15850	0	0	1	1	0	0	1	1	0	0	1
15850 to15950	0	0	1	1	0	0	1	1	0	1	1
15950 to 16050	0	0	1	1	0	0	1	1	0	1	0
16050 to 16150	0	0	1	1	0	0	1	1	1	1	0
16150 to 16250	0	0	1	1	0	0	1	1	1	0	0
16250 to 16350	0	0	1	1	0	0	1	0	1	0	0
16350 to 16450	0	0	1	1	0	0	1	0	1	1	0
16450 to 16550	0	0	1	1	0	0	1	0	0	1	0
16550 to 16650	0	0	1	1	0	0	1	0	0	1	1
16650 to 16750	0	0	1	1	0	0	1	0	0	0	1
16750 to 16850	0	0	1	1	0	1	1	0	0	0	1
16850 to 16950	0	0	1	1	0	1	1	0	0	1	1
16950 to 17050	0	0	1	1	0	1	1	0	0	1	0
17050 to 17150	0	0	1	1	0	1	1	0	1	1	0
17150 to 17250	0	0	1	1	0	1	1	0	1	0	0
17250 to 17350	0	0	1	1	0	1	1	1	1	0	0
17350 to17450	0	0	1	1	0	1	1	1	1	1	0
17450 to 17550	0	0	1	1	0	1	1	1	0	1	0
17550 to 17650	0	0	1	1	0	1	1	1	0	1	1
17650 to 17750	0	0	1	1	0	1	1	1	0	0	1
17750 to 17850	0	0	1	1	0	1	0	1	0	0	1
17850 to17950	0	0	1	1	0	1	0	1	0	1	1
17950 to 18050	0	0	1	1	0	1	0	1	0	1	0
18050 to 18150	0	0	1	1	0	1	0	1	1	1	0
18150 to18250	0	0	1	1	0	1	0	1	1	0	0
18250 to 18350	0	0	1	1	0	1	0	0	1	0	0
18350 to 18450	0	0	1	1	0	1	0	0	1	1	0
18450 to 18550	0	0	1	1	0	1	0	0	0	1	0
18550 to 18650	0	0	1	1	0	1	0	0	0	1	1
18650 to 18750	0	0	1	1	0	1	0	0	0	0	1
18750 to 18850	0	0	1	1	1	1	0	0	0	0	1
18850 to 18950	0	0	1	1	1	1	0	0	0	1	1
18950 to 19050	0	0	1	1	1	1	0	0	0	1	0
19050 to 19150	0	0	1	1	1	1	0	0	1	1	0
19150 to 19250	0	0	1	1	1	1	0	0	1	0	0
19250 to 19350	0	0	1	1	1	1	0	1	1	0	0
19350 to 19450	0	0	1	1	1	1	0	1	1	1	0
19450 to 19550	0	0	1	1	1	1	0	1	0	1	0
19550 to 19650	0	0	1	1	1	1	0	1	0	1	1
19650 to 19750	0	0	1	1	1	1	0	1	0	0	1
19750 to 19850	0	0	1	1	1	1	1	1	0	0	1
19850 to 19950	0	0	1	1	1	1	1	1	0	1	1

Gray Code From 19950' to 24150'

Altitude Range	D2	D4	A1	A2	A4	B1	B2	B4	C1	C2	C4
19950 to 20050	0	0	1	1	1	1	1	1	0	1	0
20050 to 20150	0	0	1	1	1	1	1	1	1	1	0
20150 to 20250	0	0	1	1	1	1	1	1	1	0	0
20250 to 20350	0	0	1	1	1	1	1	0	1	0	0
20350 to 20450	0	0	1	1	1	1	1	0	1	1	0
20450 to 20550	0	0	1	1	1	1	1	0	0	1	0
20550 to 20650	0	0	1	1	1	1	1	0	0	1	1
20650 to 20750	0	0	1	1	1	1	1	0	0	0	1
20750 to 20850	0	0	1	1	1	0	1	0	0	0	1
20850 to 20950	0	0	1	1	1	0	1	0	0	1	1
20950 to 21050	0	0	1	1	1	0	1	0	0	1	0
21050 to 21150	0	0	1	1	1	0	1	0	1	1	0
21150 to 21250	0	0	1	1	1	0	1	0	1	0	0
21250 to 21350	0	0	1	1	1	0	1	1	1	0	0
21350 to 21450	0	0	1	1	1	0	1	1	1	1	0
21450 to 21550	0	0	1	1	1	0	1	1	0	1	0
21550 to 21650	0	0	1	1	1	0	1	1	0	1	1
21650 to 21750	0	0	1	1	1	0	1	1	0	0	1
21750 to 21850	0	0	1	1	1	0	0	1	0	0	1
21850 to 21950	0	0	1	1	1	0	0	1	0	1	1
21950 to 22050	0	0	1	1	1	0	0	1	0	1	0
22050 to 22150	0	0	1	1	1	0	0	1	1	1	0
22150 to 22250	0	0	1	1	1	0	0	1	1	0	0
22250 to 22350	0	0	1	1	1	0	0	0	1	0	0
22350 to 22450	0	0	1	1	1	0	0	0	1	1	0
22450 to 22550	0	0	1	1	1	0	0	0	0	1	0
22550 to 22650	0	0	1	1	1	0	0	0	0	1	1
22650 to 22750	0	0	1	1	1	0	0	0	0	0	1
22750 to 22850	0	0	1	0	1	0	0	0	0	0	1
22850 to 22950	0	0	1	0	1	0	0	0	0	1	1
22950 to 23050	0	0	1	0	1	0	0	0	0	1	0
23050 to 23150	0	0	1	0	1	0	0	0	1	1	0
23150 to 23250	0	0	1	0	1	0	0	0	1	0	0
23250 to 23450	0	0	1	0	1	0	0	1	1	0	0
23450 to 23550	0	0	1	0	1	0	0	1	1	1	0
23550 to 23650	0	0	1	0	1	0	0	1	0	1	0
23650 to 23750	0	0	1	0	1	0	0	1	0	1	1
23750 to 23850	0	0	1	0	1	0	1	1	0	0	1
23850 to 23950	0	0	1	0	1	0	1	1	0	0	1
23950 to 24050	0	0	1	0	1	0	1	1	0	1	1
24050 to 24150	0	0	1	0	1	0	1	1	0	1	0
24150 to 24250	0	0	1	0	1	0	1	1	1	1	0

Gray Code From 24250' to 28350'

Altitude Range	D2	D4	A1	A2	A4	B1	B2	B4	C1	C2	C4
24250 to 24350	0	0	1	0	1	0	1	0	1	0	0
24350 to 24450	0	0	1	0	1	0	1	0	1	1	0
24450 to 24550	0	0	1	0	1	0	1	0	0	1	0
24550 to 24650	0	0	1	0	1	0	1	0	0	1	1
24650 to 24750	0	0	1	0	1	0	1	0	0	0	1
24750 to 24850	0	0	1	0	1	1	1	0	0	0	1
24850 to 24950	0	0	1	0	1	1	1	0	0	1	1
24950 to 25050	0	0	1	0	1	1	1	0	0	1	0
25050 to 25150	0	0	1	0	1	1	1	0	1	1	0
25150 to 25250	0	0	1	0	1	1	1	0	1	0	0
25250 to 25350	0	0	1	0	1	1	1	1	1	0	0
25350 to 25450	0	0	1	0	1	1	1	1	1	1	0
25450 to 25550	0	0	1	0	1	1	1	1	0	1	0
25550 to 25650	0	0	1	0	1	1	1	1	0	1	1
25650 to 25750	0	0	1	0	1	1	1	1	0	0	1
25750 to 25850	0	0	1	0	1	1	0	1	0	0	1
25850 to 25950	0	0	1	0	1	1	0	1	0	1	1
25950 to 26050	0	0	1	0	1	1	0	1	0	1	0
26050 to 26150	0	0	1	0	1	1	0	1	1	1	0
26150 to 26250	0	0	1	0	1	1	0	1	1	0	0
26250 to 26350	0	0	1	0	1	1	0	0	1	0	0
26350 to 26450	0	0	1	0	1	1	0	0	1	1	0
26450 to 26550	0	0	1	0	1	1	0	0	0	1	0
26550 to 26650	0	0	1	0	1	1	0	0	0	1	1
26650 to 26750	0	0	1	0	1	1	0	0	0	0	1
26750 to 26850	0	0	1	0	0	1	0	0	0	0	1
26850 to 26950	0	0	1	0	0	1	0	0	0	1	1
26950 to 27050	0	0	1	0	0	1	0	0	0	1	0
27050 to 27150	0	0	1	0	0	1	0	0	1	1	0
27150 to 27250	0	0	1	0	0	1	0	0	1	0	0
27250 to 27350	0	0	1	0	0	1	0	1	1	0	0
27350 to 27450	0	0	1	0	0	1	0	1	1	1	0
27450 to 27550	0	0	1	0	0	1	0	1	0	1	0
27550 to 27650	0	0	1	0	0	1	0	1	0	1	1
27650 to 27750	0	0	1	0	0	1	0	1	0	0	1
27750 to 27850	0	0	1	0	0	1	1	1	0	0	1
27850 to 27950	0	0	1	0	0	1	1	1	0	1	1
27950 to 28050	0	0	1	0	0	1	1	1	0	1	0
28050 to 28150	0	0	1	0	0	1	1	1	1	1	0
28150 to 28250	0	0	1	0	0	1	1	1	1	0	0
28250 to 28350	0	0	1	0	0	1	1	0	1	0	0
28350 to 28450	0	0	1	0	0	1	1	0	1	1	0

Gray Code From 28450' to 32550'

Altitude Range	D2	D4	A1	A2	A4	B1	B2	B4	C1	C2	C4
28450 to 28550	0	0	1	0	0	1	1	0	0	1	0
28550 to 28650	0	0	1	0	0	1	1	0	0	1	1
28650 to 28750	0	0	1	0	0	1	1	0	0	0	1
28750 to 28850	0	0	1	0	0	0	1	0	0	0	1
28850 to 28950	0	0	1	0	0	0	1	0	0	1	1
28950 to 29050	0	0	1	0	0	0	1	0	0	1	0
29050 to 29150	0	0	1	0	0	0	1	0	1	1	0
29150 to 29250	0	0	1	0	0	0	1	0	1	0	0
29250 to 29350	0	0	1	0	0	0	1	1	1	0	0
29350 to 29450	0	0	1	0	0	0	1	1	1	1	0
29450 to 29550	0	0	1	0	0	0	1	1	0	1	0
29550 to 29650	0	0	1	0	0	0	1	1	0	1	1
29650 to 29750	0	0	1	0	0	0	1	1	0	0	1
29750 to 29850	0	0	1	0	0	0	0	1	0	0	1
29850 to 29959	0	0	1	0	0	0	0	1	0	1	1
29950 to 30050	0	0	1	0	0	0	0	1	0	1	0
30050 to 30150	0	0	1	0	0	0	0	1	1	1	0
30150 to 30250	0	0	1	0	0	0	0	1	1	0	0
30250 to 30350	0	0	1	0	0	0	0	0	1	0	0
30350 to 30450	0	0	1	0	0	0	0	0	1	1	0
30450 to 30550	0	0	1	0	0	0	0	0	0	1	0
30550 to 30650	0	0	1	0	0	0	0	0	0	1	1
30650 to 30750	0	0	1	0	0	0	0	0	0	0	1
30750 to 30850	0	1	1	0	0	0	0	0	0	0	1
30850 to 30950	0	1	1	0	0	0	0	0	0	1	1
30950 to 31050	0	1	1	0	0	0	0	0	0	1	0
31050 to 31150	0	1	1	0	0	0	0	0	1	1	0
31150 to 31250	0	1	1	0	0	0	0	0	1	0	0
31250 to 31350	0	1	1	0	0	0	0	1	1	0	0
31350 to 31450	0	1	1	0	0	0	0	1	1	1	0
31450 to 31550	0	1	1	0	0	0	0	1	0	1	0
31550 to 31650	0	1	1	0	0	0	0	1	0	1	1
31650 to 31750	0	1	1	0	0	0	0	1	0	0	1
31750 to 31850	0	1	1	0	0	0	1	1	0	0	1
31850 to 31950	0	1	1	0	0	0	1	1	0	1	1
31950 to 32050	0	1	1	0	0	0	1	1	0	1	0
32050 to 32150	0	1	1	0	0	0	1	1	1	1	0
32150 to 32250	0	1	1	0	0	0	1	1	1	0	0
32250 to 32350	0	1	1	0	0	0	1	0	1	0	0
32350 to 32450	0	1	1	0	0	0	1	0	1	1	0
32450 to 32550	0	1	1	0	0	0	1	0	0	1	0
32550 to 32650	0	1	1	0	0	0	1	0	0	1	1

Gray Code From 32650' to 35750'

Altitude Range	D2	D4	A1	A2	A4	B1	B2	B4	C1	C2	C4
32650 to 32750	0	1	1	0	0	1	1	0	0	0	1
32750 to 32850	0	1	1	0	0	1	1	0	0	0	1
32850 to 32950	0	1	1	0	0	1	1	0	0	1	1
32950 to 32050	0	1	1	0	0	1	1	0	0	1	0
32050 to 32150	0	1	1	0	0	1	1	0	1	1	0
32150 to 32250	0	1	1	0	0	1	1	0	1	0	0
32250 to 32350	0	1	1	0	0	1	1	1	1	0	0
32350 to 32450	0	1	1	0	0	1	1	1	1	1	0
32450 to 32550	0	1	1	0	0	1	1	1	0	1	0
32550 to 32650	0	1	1	0	0	1	1	1	0	1	1
32650 to 32750	0	1	1	0	0	1	0	1	0	0	1
32750 to 32850	0	1	1	0	0	1	0	1	0	0	1
32850 to 33950	0	1	1	0	0	1	0	1	0	1	1
32950 to 33050	0	1	1	0	0	1	0	1	0	1	0
33050 to 33150	0	1	1	0	0	1	0	1	1	1	0
33150 to 33250	0	1	1	0	0	1	0	1	1	0	0
33250 to 33350	0	1	1	0	0	1	0	0	1	0	0
33350 to 33450	0	1	1	0	0	1	0	0	1	1	0
33450 to 33550	0	1	1	0	0	1	0	0	0	1	0
33550 to 33650	0	1	1	0	0	1	0	0	0	1	1
33650 to 33750	0	1	1	0	0	1	0	0	0	0	1
33750 to 33850	0	1	1	0	0	1	0	0	0	0	1
33850 to 33950	0	1	1	0	0	1	0	0	0	1	1
33950 to 34050	0	1	1	0	0	1	0	0	0	1	0
34050 to 34150	0	1	1	0	0	1	0	0	1	1	0
34150 to 34250	0	1	1	0	0	1	0	0	1	0	0
34250 to 34350	0	1	1	0	0	1	0	1	1	0	0
34350 to 34450	0	1	1	0	0	1	0	1	1	1	0
34450 to 34550	0	1	1	0	0	1	0	1	0	1	0
34550 to 34650	0	1	1	0	0	1	0	1	0	1	1
34650 to 34750	0	1	1	0	0	1	0	1	0	0	1
34750 to 34850	0	1	1	0	1	1	0	1	0	0	1
34850 to 34950	0	1	1	0	1	1	0	1	0	1	1
34950 to 35050	0	1	1	0	1	1	0	1	0	1	0
35050 to 35150	0	1	1	0	1	1	0	1	1	1	0
35150 to 35250	0	1	1	0	1	1	0	1	1	0	0
35250 to 35350	0	1	1	0	1	1	0	0	1	0	0
35350 to 35450	0	1	1	0	1	1	0	0	1	1	0
35450 to 35550	0	1	1	0	1	1	0	0	0	1	0
35550 to 35650	0	1	1	0	1	1	0	0	0	1	1
35650 to 35750	0	1	1	0	1	1	0	0	0	0	1
35750 to 35850	0	1	1	0	1	1	0	0	0	0	1

Gray Code From 35850' to 39950'

Altitude Range	D2	D4	A1	A2	A4	B1	B2	B4	C1	C2	C4
35850 to 35950	0	1	1	0	1	1	1	1	0	1	1
35950 to 36050	0	1	1	0	1	1	1	1	0	1	0
36050 to 36150	0	1	1	0	1	1	1	1	1	1	0
36150 to 36250	0	1	1	0	1	1	1	1	1	0	0
36250 to 36350	0	1	1	0	1	1	1	0	1	0	0
36350 to 36450	0	1	1	0	1	1	1	0	1	1	0
36450 to 36550	0	1	1	0	1	1	1	0	0	1	0
36550 to 36650	0	1	1	0	1	1	1	0	0	1	1
36650 to 36750	0	1	1	0	1	1	1	0	0	0	1
36750 to 36850	0	1	1	0	1	0	1	0	0	0	1
36850 to 37950	0	1	1	0	1	0	1	0	0	1	1
36950 to 37050	0	1	1	0	1	0	1	0	0	1	0
37050 to 37150	0	1	1	0	1	0	1	0	1	1	0
37150 to 37250	0	1	1	0	1	0	1	0	1	0	0
37250 to 37350	0	1	1	0	1	0	1	1	1	0	0
37350 to 37450	0	1	1	0	1	0	1	1	1	1	0
37450 to 37550	0	1	1	0	1	0	1	1	0	1	0
37550 to 37650	0	1	1	0	1	0	1	1	0	1	1
37650 to 37750	0	1	1	0	1	0	1	1	0	0	1
37750 to 37850	0	1	1	0	1	0	0	1	0	0	1
37850 to 37950	0	1	1	0	1	0	0	1	0	1	1
37950 to 38050	0	1	1	0	1	0	0	1	0	1	0
38050 to 38150	0	1	1	0	1	0	0	1	1	1	0
38150 to 38250	0	1	1	0	1	0	0	1	1	0	0
38250 to 38350	0	1	1	0	1	0	0	0	1	0	0
38350 to 38450	0	1	1	0	1	0	0	0	1	1	0
38450 to 38550	0	1	1	0	1	0	0	0	0	1	0
38550 to 38650	0	1	1	0	1	0	0	0	0	1	1
38650 to 38750	0	1	1	0	1	0	0	0	0	0	1
38750 to 38850	0	1	1	1	1	0	0	0	0	0	1
38850 to 38950	0	1	1	1	1	0	0	0	0	1	1
38950 to 39050	0	1	1	1	1	0	0	0	0	1	0
39050 to 39150	0	1	1	1	1	0	0	0	1	1	0
39150 to 39250	0	1	1	1	1	0	0	0	1	0	0
39250 to 39350	0	1	1	1	1	0	0	1	1	0	0
39350 to 39450	0	1	1	1	1	0	0	1	1	1	0
39450 to 39550	0	1	1	1	1	0	0	1	0	1	0
39550 to 39650	0	1	1	1	1	0	0	1	0	1	1
39650 to 39750	0	1	1	1	1	0	0	1	0	0	1
39750 to 39850	0	1	1	1	1	0	1	1	0	0	1
39850 to 39950	0	1	1	1	1	0	1	1	0	1	1
39950 to 40050	0	1	1	1	1	0	1	1	0	1	0

Gray Code From 40050’ to 44150’

Altitude Range	D2	D4	A1	A2	A4	B1	B2	B4	C1	C2	C4
40050 to 40150	0	1	1	0	1	0	1	1	1	1	0
40150 to 40250	0	1	1	0	1	0	1	1	1	0	0
40250 to 40350	0	1	1	0	1	0	1	0	1	0	0
40350 to 40450	0	1	1	0	1	0	1	0	1	1	0
40450 to 40550	0	1	1	0	1	0	1	0	0	1	0
40550 to 40650	0	1	1	0	1	0	1	0	0	1	1
40650 to 40750	0	1	1	0	1	0	1	0	0	0	1
40750 to 40850	0	1	1	0	1	1	1	0	0	0	1
40850 to 40950	0	1	1	0	1	1	1	0	0	1	1
40950 to 41050	0	1	1	0	1	1	1	0	0	1	0
41050 to 41150	0	1	1	0	1	1	1	0	1	1	0
41150 to 41250	0	1	1	0	1	1	1	0	1	0	0
41250 to 41350	0	1	1	0	1	1	1	1	1	0	0
41350 to 41450	0	1	1	0	1	1	1	1	1	1	0
41450 to 41550	0	1	1	0	1	1	1	1	0	1	0
41550 to 41650	0	1	1	0	1	1	1	1	0	1	1
41650 to 41750	0	1	1	0	1	1	1	1	0	0	1
41750 to 41850	0	1	1	0	1	1	0	1	0	0	1
41850 to 41950	0	1	1	0	1	1	0	1	0	1	1
41950 to 42050	0	1	1	0	1	1	0	1	0	1	0
42050 to 42150	0	1	1	0	1	1	0	1	1	1	0
42150 to 42250	0	1	1	0	1	1	0	1	1	0	0
42250 to 42350	0	1	1	0	1	1	0	0	1	0	0
42350 to 42450	0	1	1	0	1	1	0	0	1	1	0
42450 to 42550	0	1	1	0	1	1	0	0	0	1	0
42550 to 42650	0	1	1	0	1	1	0	0	0	1	1
42650 to 42750	0	1	1	0	1	1	0	0	0	0	1
42750 to 42850	0	1	1	0	0	1	0	0	0	0	1
42850 to 42950	0	1	1	0	0	1	0	0	0	1	1
42950 to 43050	0	1	1	1	0	1	0	0	0	1	0
43050 to 43150	0	1	1	1	0	1	0	0	1	1	0
43150 to 43250	0	1	1	1	0	1	0	0	1	0	0
43250 to 43350	0	1	1	1	0	1	0	1	1	0	0
43350 to 43450	0	1	1	1	0	1	0	1	1	1	0
43450 to 43550	0	1	1	1	0	1	0	1	0	1	0
43550 to 43650	0	1	1	1	0	1	0	1	0	1	1
43650 to 43750	0	1	1	1	0	1	0	1	0	0	1
43750 to 43850	0	1	1	1	0	1	1	1	0	0	1
43850 to 43950	0	1	1	1	0	1	1	1	0	1	1
43950 to 44050	0	1	1	1	0	1	1	1	0	1	0
44050 to 44150	0	1	1	1	0	1	1	1	1	1	0
44150 to 44250	0	1	1	1	0	1	1	1	1	0	0

Gray Code From 44250' to 48350'

Altitude Range	D2	D4	A1	A2	A4	B1	B2	B4	C1	C2	C4
44250 to 44350	0	1	1	1	0	1	1	0	1	0	0
44350 to 44450	0	1	1	1	0	1	1	0	1	1	0
44450 to 44550	0	1	1	1	0	1	1	0	0	1	0
44550 to 44650	0	1	1	1	0	1	1	0	0	1	1
44650 to 44750	0	1	1	1	0	1	1	0	0	0	1
44750 to 44850	0	1	1	1	0	0	1	0	0	0	1
44850 to 44950	0	1	1	1	0	0	1	0	0	1	1
44950 to 45050	0	1	1	1	0	0	1	0	0	1	0
45050 to 45150	0	1	1	1	0	0	1	0	1	1	0
45150 to 45250	0	1	1	1	0	0	1	0	1	0	0
45250 to 45350	0	1	1	1	0	0	1	1	1	0	0
45350 to 45450	0	1	1	1	0	0	1	1	1	1	0
45450 to 45550	0	1	1	1	0	0	1	1	0	1	0
45550 to 45650	0	1	1	1	0	0	1	1	0	1	1
45650 to 45750	0	1	1	1	0	0	1	1	0	0	1
45750 to 45850	0	1	1	1	0	0	0	1	0	0	1
45850 to 45950	0	1	1	1	0	0	0	1	0	1	1
45950 to 46050	0	1	1	1	0	0	0	1	0	1	0
46050 to 46150	0	1	1	1	0	0	0	1	1	1	0
46150 to 46250	0	1	1	1	0	0	0	1	1	0	0
46250 to 46350	0	1	1	1	0	0	0	0	1	0	0
46350 to 46450	0	1	1	1	0	0	0	0	1	1	0
46450 to 46550	0	1	1	1	0	0	0	0	0	1	0
46550 to 46650	0	1	1	1	0	0	0	0	0	1	1
46650 to 46750	0	1	1	1	0	0	0	0	0	0	1
46750 to 46850	0	1	0	1	0	0	0	0	0	0	1
46850 to 46950	0	1	0	1	0	0	0	0	0	1	1
46950 to 47050	0	1	0	1	0	0	0	0	0	1	0
47050 to 47150	0	1	0	1	0	0	0	0	1	1	0
47150 to 47250	0	1	0	1	0	0	0	0	1	0	0
47250 to 47350	0	1	0	1	0	0	0	1	1	0	0
47350 to 47450	0	1	0	1	0	0	0	1	1	1	0
47450 to 47550	0	1	0	1	0	0	0	1	0	1	0
47550 to 47650	0	1	0	1	0	0	0	1	0	1	1
47650 to 47750	0	1	0	1	0	0	0	1	0	0	1
47750 to 47850	0	1	0	1	0	0	1	1	0	0	1
47850 to 47950	0	1	0	1	0	0	1	1	0	1	1
47950 to 48050	0	1	0	1	0	0	1	1	0	1	0
48050 to 48150	0	1	0	1	0	0	1	1	1	1	0
48150 to 48250	0	1	0	1	0	0	1	1	1	0	0
48250 to 48350	0	1	0	1	0	0	1	0	1	0	0
48350 to 48450	0	1	0	1	0	0	1	0	1	1	0

Gray Code   From 48450' to 52550'

Altitude Range	D2	D4	A1	A2	A4	B1	B2	B4	C1	C2	C4
48450 to 48550	0	1	0	1	0	0	1	0	0	1	0
48550 to 48650	0	1	0	1	0	0	1	0	0	1	1
48650 to 48750	0	1	0	1	0	0	1	0	0	0	1
48750 to 48850	0	1	0	1	0	1	1	0	0	0	1
48850 to 48950	0	1	0	1	0	1	1	0	0	1	1
48950 to 49050	0	1	0	1	0	1	1	0	0	1	0
49050 to 49150	0	1	0	1	0	1	1	0	1	1	0
49150 to 49250	0	1	0	1	0	1	1	0	1	0	0
49250 to 49350	0	1	0	1	0	1	1	1	1	0	0
49350 to 49450	0	1	0	1	0	1	1	1	1	1	0
49450 to 49550	0	1	0	1	0	1	1	1	0	1	0
49550 to 49650	0	1	0	1	0	1	1	1	0	1	1
49650 to 49750	0	1	0	1	0	1	1	1	0	0	1
49750 to 49850	0	1	0	1	0	1	0	1	0	0	1
49850 to 49950	0	1	0	1	0	1	0	1	0	1	1
49950 to 50050	0	1	0	1	0	1	0	1	0	1	0
50050 to 50150	0	1	0	1	0	1	0	1	1	1	0
50150 to 50250	0	1	0	1	0	1	0	1	1	0	0
50250 to 50350	0	1	0	1	0	1	0	0	1	0	0
50350 to 50450	0	1	0	1	0	1	0	0	1	1	0
50450 to 50550	0	1	0	1	0	1	0	0	0	1	0
50550 to 50650	0	1	0	1	0	1	0	0	0	1	1
50650 to 50750	0	1	0	1	0	1	0	0	0	0	1
50750 to 50850	0	1	0	1	1	1	0	0	0	0	1
50850 to 50950	0	1	0	1	1	1	0	0	0	1	1
50950 to 51050	0	1	0	1	1	1	0	0	0	1	0
51050 to 51150	0	1	0	1	1	1	0	0	1	1	0
51150 to 51250	0	1	0	1	1	1	0	0	1	0	0
51250 to 51350	0	1	0	1	1	1	0	1	1	0	0
51350 to 51450	0	1	0	1	1	1	0	1	1	1	0
51450 to 51550	0	1	0	1	1	1	0	1	0	1	0
51550 to 51650	0	1	0	1	1	1	0	1	0	1	1
51650 to 51750	0	1	0	1	1	1	0	1	0	0	1
51750 to 51850	0	1	0	1	1	1	1	1	0	0	1
51850 to 51950	0	1	0	1	1	1	1	1	0	1	1
51950 to 52050	0	1	0	1	1	1	1	1	0	1	0
52050 to 52150	0	1	0	1	1	1	1	1	1	1	0
52150 to 52250	0	1	0	1	1	1	1	1	1	0	0
52250 to 52350	0	1	0	1	1	1	1	0	1	0	0
52350 to 52450	0	1	0	1	1	1	1	0	1	1	0
52450 to 52550	0	1	0	1	1	1	1	0	0	1	0
52550 to 52650	0	1	0	1	1	1	1	0	0	1	1

Gray Code From 52650' to 56750'

Altitude Range	D2	D4	A1	A2	A4	B1	B2	B4	C1	C2	C4
52650 to 52750	0	1	0	1	1	1	1	0	0	0	1
52750 to 52850	0	1	0	1	1	0	1	0	0	0	1
52850 to 52950	0	1	0	1	1	0	1	0	0	1	1
52950 to 53050	0	1	0	1	1	0	1	0	0	1	0
53050 to 53150	0	1	0	1	1	0	1	0	1	1	0
53150 to 53250	0	1	0	1	1	0	1	0	1	0	0
53250 to 53350	0	1	0	1	1	0	1	1	1	0	0
53350 to 53450	0	1	0	1	1	0	1	1	1	1	0
53450 to 53550	0	1	0	1	1	0	1	1	0	1	0
53550 to 53650	0	1	0	1	1	0	1	1	0	1	1
53650 to 53750	0	1	0	1	1	0	1	1	0	0	1
53750 to 53850	0	1	0	1	1	0	0	1	0	0	1
53850 to 53950	0	1	0	1	1	0	0	1	0	1	1
53950 to 54050	0	1	0	1	1	0	0	1	0	1	0
54050 to 54150	0	1	0	1	1	0	0	1	1	1	0
54150 to 54250	0	1	0	1	1	0	0	1	1	0	0
54250 to 54350	0	1	0	1	1	0	0	0	1	0	0
54350 to 54450	0	1	0	1	1	0	0	0	1	1	0
54450 to 54550	0	1	0	1	1	0	0	0	0	1	0
54550 to 54650	0	1	0	1	1	0	0	0	0	1	1
54650 to 54750	0	1	0	1	1	0	0	0	0	0	1
54750 to 54850	0	1	0	0	1	0	0	0	0	0	1
54850 to 54950	0	1	0	0	1	0	0	0	0	1	1
54950 to 55050	0	1	0	0	1	0	0	0	0	1	0
55050 to 55150	0	1	0	0	1	0	0	0	1	1	0
55150 to 55250	0	1	0	0	1	0	0	0	1	0	0
55250 to 55350	0	1	0	0	1	0	0	0	1	0	0
55350 to 55450	0	1	0	0	1	0	0	0	1	1	0
55450 to 55550	0	1	0	0	1	0	0	1	0	1	0
55550 to 55650	0	1	0	0	1	0	0	1	0	1	1
55650 to 55750	0	1	0	0	1	0	0	1	0	0	1
55750 to 55850	0	1	0	0	1	0	0	1	0	0	1
55850 to 55950	0	1	0	0	1	0	0	1	0	1	1
55950 to 56050	0	1	0	0	1	0	1	1	0	1	0
56050 to 56150	0	1	0	0	1	0	1	1	1	1	0
56150 to 56250	0	1	0	0	1	0	1	1	1	0	0
56250 to 56350	0	1	0	0	1	0	1	1	1	0	0
56350 to 56450	0	1	0	0	1	0	1	1	1	1	0
56450 to 56550	0	1	0	0	1	0	1	0	0	1	0
56550 to 56650	0	1	0	0	1	0	1	0	0	1	1
56650 to 56750	0	1	0	0	1	0	1	0	0	0	1
56750 to 56850	0	1	0	0	1	1	1	0	0	0	1

Gray Code From 56850’ to 60950’

Altitude Range	D2	D4	A1	A2	A4	B1	B2	B4	C1	C2	C4
56850 to 56950	0	1	0	0	1	1	1	0	0	1	1
56950 to 57050	0	1	0	0	1	1	1	0	0	1	0
57050 to 57150	0	1	0	0	1	1	1	0	1	1	0
57150 to 57250	0	1	0	0	1	1	1	0	1	0	0
57250 to 57350	0	1	0	0	1	1	1	1	1	0	0
57350 to 57450	0	1	0	0	1	1	1	1	1	1	0
57450 to 57550	0	1	0	0	1	1	1	1	0	1	0
57550 to 57650	0	1	0	0	1	1	1	1	0	1	1
57650 to 57750	0	1	0	0	1	1	1	1	0	0	1
57750 to 57850	0	1	0	0	1	1	0	1	0	0	1
57850 to 57950	0	1	0	0	1	1	0	1	0	1	1
57950 to 58050	0	1	0	0	1	1	0	1	0	1	0
58050 to 58150	0	1	0	0	1	1	0	1	1	1	0
58150 to 58250	0	1	0	0	1	1	0	1	1	0	0
58250 to 58350	0	1	0	0	1	1	0	0	1	0	0
58350 to 58450	0	1	0	0	1	1	0	0	1	1	0
58450 to 58550	0	1	0	0	1	1	0	0	0	1	0
58550 to 58650	0	1	0	0	1	1	0	0	0	1	1
58650 to 58750	0	1	0	0	1	1	0	0	0	0	1
58750 to 58850	0	1	0	0	0	1	0	0	0	0	1
58850 to 58950	0	1	0	0	0	1	0	0	0	1	1
58950 to 59050	0	1	0	0	0	1	0	0	0	1	0
59050 to 59150	0	1	0	0	0	1	0	0	1	1	0
59150 to 59250	0	1	0	0	0	1	0	0	1	0	0
59250 to 59350	0	1	0	0	0	1	0	1	1	0	0
59350 to 59450	0	1	0	0	0	1	0	1	1	1	0
59450 to 59550	0	1	0	0	0	1	0	1	0	1	0
59550 to 59650	0	1	0	0	0	1	0	1	0	1	1
59650 to 59750	0	1	0	0	0	1	0	1	0	0	1
59750 to 59850	0	1	0	0	0	1	1	1	0	0	1
59850 to 59950	0	1	0	0	0	1	1	1	0	1	1
59950 to 60050	0	1	0	0	0	1	1	1	0	1	0
60050 to 60150	0	1	0	0	0	1	1	1	1	1	0
60150 to 60250	0	1	0	0	0	1	1	1	1	0	0
60250 to 60350	0	1	0	0	0	1	1	0	1	0	0
60350 to 60450	0	1	0	0	0	1	1	0	1	1	0
60450 to 60550	0	1	0	0	0	1	1	0	0	1	0
60550 to 60650	0	1	0	0	0	1	1	0	0	1	1
60650 to 60750	0	1	0	0	0	1	1	0	0	0	1
60750 to 60850	0	1	0	0	0	0	1	0	0	0	1
60850 to 60950	0	1	0	0	0	0	1	0	0	1	1
60950 to 61050	0	1	0	0	0	0	1	0	0	1	0

Gray Code From 61050' to 65050'

Altitude Range	D2	D4	A1	A2	A4	B1	B2	B4	C1	C2	C4
61050 to 61150	0	1	0	0	0	0	1	0	1	1	0
61050 to 61150	0	1	0	0	0	0	1	0	1	0	0
61150 to 61250	0	1	0	0	0	0	1	1	1	0	0
61250 to 61350	0	1	0	0	0	0	1	1	1	1	0
61350 to 61450	0	1	0	0	0	0	1	1	0	1	0
61450 to 61550	0	1	0	0	0	0	1	1	0	1	1
61550 to 61650	0	1	0	0	0	0	1	1	0	0	1
61650 to 61750	0	1	0	0	0	0	0	1	0	0	1
61750 to 61850	0	1	0	0	0	0	0	1	0	1	1
61850 to 61950	0	1	0	0	0	0	0	1	0	1	0
61950 to 62050	0	1	0	0	0	0	0	1	1	1	0
62050 to 62150	0	1	0	0	0	0	0	1	1	0	0
62150 to 62250	0	1	0	0	0	0	0	0	1	0	0
62250 to 62350	0	1	0	0	0	0	0	0	1	1	0
62350 to 62450	0	1	0	0	0	0	0	0	0	1	0
62450 to 62550	0	1	0	0	0	0	0	0	0	1	1
62550 to 62650	0	1	0	0	0	0	0	0	0	0	1
62650 to 62750	0	1	0	0	0	0	0	0	0	0	1
62750 to 62850	1	1	0	0	0	0	0	0	0	1	1
62850 to 62950	1	1	0	0	0	0	0	0	0	1	0
62950 to 63050	1	1	0	0	0	0	0	0	1	1	0
63050 to 63150	1	1	0	0	0	0	0	0	1	0	0
63150 to 63250	1	1	0	0	0	0	0	1	1	0	0
63250 to 63350	1	1	0	0	0	0	0	1	1	1	0
63350 to 63450	1	1	0	0	0	0	0	1	0	1	0
63450 to 63550	1	1	0	0	0	0	0	1	0	1	1
63550 to 63650	1	1	0	0	0	0	0	1	0	0	1
63650 to 63750	1	1	0	0	0	0	1	1	0	0	1
63750 to 63850	1	1	0	0	0	0	1	1	0	1	1
63850 to 63950	1	1	0	0	0	0	1	1	0	1	0
63950 to 64050	1	1	0	0	0	0	1	1	1	1	0
64050 to 64150	1	1	0	0	0	0	1	1	1	0	0
64150 to 64250	1	1	0	0	0	0	1	0	1	0	0
64250 to 64350	1	1	0	0	0	0	1	0	1	1	0
64350 to 64450	1	1	0	0	0	0	1	0	0	1	0
64450 to 64550	1	1	0	0	0	0	1	0	0	1	1
64550 to 64650	1	1	0	0	0	0	1	0	0	0	1
64650 to 64750	1	1	0	0	0	0	1	0	0	0	1
64750 to 64850	1	1	0	0	0	1	1	0	0	1	1
64850 to 64950	1	1	0	0	0	1	1	0	0	1	0
64950 to 65050	1	1	0	0	0	1	1	0	0	1	0
65050 to 65150	1	1	0	0	0	1	1	0	1	1	0

WARRANTY REGISTRATION

Trans-Cal Industries warrants each Model EET-200E Encoder Emulator to be free of defects in workmanship and materials for a period of 18 months after purchase. This warranty applies to the original purchaser of the instrument.

Trans-Cal's obligation under this warranty is limited to repairing or replacing any EET-200 unit returned to Trans-Cal during the life of this warranty provided:

(1) The defective unit is returned to us, **transportation pre-paid.**
(2) Prior approval is obtained from Trans-Cal.
(3) The unit has not been damaged by misuse, neglect, improper operation, accident, alteration or improper installation.

Trans-Cal **DOES NOT** reimburse labor costs on warranty repairs.

Trans-Cal IS NOT responsible for damage to devices connected improperly to this device, and makes no claim as to the suitability of the device to test instruments other than those manufactured by Trans-Cal Industries, Inc.

Trans-Cal Industries will be the sole judge as to the cause of the malfunction and wherein the responsibility lies. No other obligation or liability is expressed or implied.

For the above warranty to become effective, the attached registration card **must** be completed and returned to Trans-Cal Industries, properly filled out and signed by the dealer selling or installing this equipment.

Mail to: Trans-Cal Ind., Inc., 16141 Cohasset St., Van Nuys, CA 91406

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MODEL: EET-200E Encoder Emulator SERIAL NO: EET-200E____________

OWNER:____

ADDRESS:____

CITY:________________________________ **STATE:**_______**ZIP:**___________

DEALER:____

SIGNED:____

PRINT NAME:____